

BOOK REVIEWS

APPLIED AND FUNDAMENTAL ASPECTS OF PLANT CELL, TISSUE AND ORGAN CULTURE, edited by J. Reinert and Y. P. S. Bajaj, with pp. xvi + 803 and 181 figures. Berlin, Heidelberg, New York: Springer-Verlag, 1977. DM 190, US \$83.60.

This book, consisting of seven chapters written by a total of 49 contributors, covers a whole array of disciplines, techniques and applications in the general area of plant tissue culture. The treatise contains a contribution by Dr J. Button, a South African tissue culture researcher formerly of the University of Natal, Pietermaritzburg and Dr J. Kochba, an Israeli horticulturalist who spent 1972 on sabbatical leave in the Department of Botany at the University of Natal. Their contribution is on tissue culture in relation to the citrus industry and reflects the high standard of botanical research carried out at the University of Natal.

The book is well-suited to the shelves of those institutes where TC research is of a multi-disciplinary nature. Researchers with a more specialized interest would probably concern themselves with only a few chapters at most. Chapters are conveniently organized and both the subsections and the material within them follow a logical and progressive sequence: logical, in that early history, current status of research, scope and literature are well discussed; and progressive, in that areas of more or less ever-increasing complexity follow one upon the other.

It is probably inevitable that much of the material presented reflects the labours of the contributing authors themselves, but good editorship has resulted in a unitary presentation that is not unpleasant. There are few typographical errors (e.g. under Acknowledgments in the Button and Kochba chapter Fig. 1 should read Fig. 2).

One of the most interesting contributions is that of C. J. Jensen on monoploid production by chromosome elimination, in Chapter II under Haploids. This so-called bulbosum technique is now finding application in plant breeding programmes. Chapter IV, which deals with protoplasts, somatic hybridization and genetic engineering assesses the present status of knowledge and outlines the possible future approaches in applying methodology from the medical and bacteriological sciences to higher plant cell systems. Uses of recombinant DNA, plasmid transfer, transduction, transformation and mutagenesis are touched on, as are aspects of cellular organelle and organismal transfer.

This book is expensive, but it is a reference work and should prove good value for the investment.

CHRIS H. BORNMAN

GENETIC AND MOLECULAR BASIS OF PLANT PATHOGENESIS, by J. E. Vanderplank, with pp. xi + 167, 3 figures and 36 tables. Berlin, Heidelberg, New York, Springer-Verlag, 1978. Volume 6 in the series "Advanced Series in Agricultural Sciences". Cloth DM 48, US \$24.00.

This volume is the third on Plant Pathology in the Advanced Series in Agricultural Sciences. Typographically the text is accurate and well indexed. The format is modern and the style is succinct. However, the frontispiece plate of precambrian fossils is somewhat incongruous and the figures of amino acid structures are inappropriately elementary in an advanced treatise. Schematic models to illustrate the essence of Dr Vanderplank's postulate would have been a worthwhile supplement to the text. There is a large compilation of useful data tabulated in an abridged form which makes this volume a recommended reference book for plant pathologists. However, there is a tendency towards an excessive and unnecessary use of footnotes to tables.

Dr Vanderplank, internationally recognised for his work on quantitative epidemiology, has set out to achieve two objectives in this volume: firstly, to provide further evidence for, and clarification of, his controversial views on the population genetics of pathogens and host plants and, secondly, to provide evidence for, and to derive a unifying hypothesis on the molecular basis of pathogenesis, host resistance and host specificity.

The author's familiarity with, and eminence in the epidemiological field are exemplified in chapters one, six and seven, which incidentally should have been arranged consecutively. The clear, purposeful and in-depth treatment of the population genetics and the genetic basis of resistance should clear-up much of the confusion and misinterpretation that arose from his earlier publications and which probably were the causes of much of the criticism levelled at his ideas. Chapters one, six and seven are for general readership by plant pathologists and may be read independently. These chapters are certainly a further contribution by Dr Vanderplank to rationalizing thought and practice in quantitative epidemiology.

The same cannot be said for the rest of the volume which is about Dr Vanderplank's protein-for-protein hypothesis. In the author's inimitable way he makes his opening gambit (lines 1-3, chap. 2): "In diseases in which host and pathogen are involved gene for gene, susceptibility involves the copolymerization of protein from the host with protein from the pathogen". This unsubstantiated statement at once suggests that this volume is not suitable for the uninitiated and inexperienced—further reading confirms this viewpoint. Dr Vanderplank will be judged to have ventured beyond the ambit of his direct experience. Evidence compiled from more than 300 references spanning 50 years or more, is admittedly well collated, convincingly arranged and demonstrates the author's originality and considerable perspective. However, neither the manner of presentation of speculative, circumstantial and tenuous evidence nor the hypothesis derived from it are well placed in a text such as this. For example, the data in table 3.6 (p. 61) show (statistically that is) no significant difference in resistance at 15C and 25C of Var. Applier in seedling and juvenile stages. Yet this is the type of unconvincing data the author uses to 'prove' the validity of his hypothesis which is largely based on the thermodynamics of protein copolymerization. The author relies heavily on the frequently observed loss of host resistance in gene-for-gene systems at elevated temperatures to prove his point. A perusal by the author of readily available data on energy budgets of potato and wheat plants with diverse leaf forms at different ambient temperatures and air movement surely would have introduced some caution into his extrapolations from ambient to internal leaf temperatures.

Brief reference, without any in-depth, objective evaluation, is made by Dr Vanderplank to the very vast and complex subjects of common antigens, non-protein biopolymers and host selective toxins (chapters 4, 5 and 8) essentially with a view to detracting from them as determinants of the fate of host-pathogen interrelationships.

The pre-eminence of this South African author in the field of epidemiology will certainly mean that this volume will have wide readership among plant pathologists in South Africa and abroad. I hope I am proved wrong but I believe that Dr Vanderplank's viewpoints on the molecular basis of plant pathogenesis will receive neither the local nor international acclaim that accompanied the publication of his epidemiological works.

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